on the northern California coast on the 20th, and moved southeastward over the plateau and Rocky Mountain regions during the 21st and 22d, reaching the lower Rio Grande valley on the morning of the 23d, unattended by any unusual disturbance, although it was preceded by high southerly winds on the Texas coast when central in the upper Rio Grande valley.

XIII and XIV.—During the 22d the pressure was unusually low along the entire northern border of the United States from the Rocky Mountains eastward to the lower Saint Lawrence valley. On the morning of the 23d this disturbance was apparently central far to the north of Minnesota. It moved to the southeastward over Lake Superior during the succeeding twenty-four hours, reaching southern Michigan on the afternoon of the 24th, after which it disappeared, owing to the formation of an extended low area central over Texas and the advance of a cold wave from the Northwest. Although chart i indicates that low area traced as number xiv developed over Texas on the 24th, it may have originated in the central Rocky Mountain region within the trough of low pressure which bounded the area of high pressure advancing from the north. With the advance southward of the cold wave over the eastern slope of the Rocky Mountains during the 25th this disturbance moved rapidly to the northeast, the pressure increasing at the centre of disturbance during the easterly movement. General rains occurred throughout the greater portion of the United States east of the Rocky Mountains during the passage of this storm, except in the northwest quadrant where the precipitation was in the form of snow.

XV.—The southerly movement of the cold wave over the Northwest and central valleys during the 24th and 25th apparently forced this disturbance from Colorado westward to Utah, after which it moved southeastward over the Rio Grande Valley and around the area of high pressure, increasing greatly in intensity after reaching the lower Mississippi valley, from which region it moved rapidly northeastward to Lake Erie, followed by the most decided cold wave of the month. This disturbance was central north of Lake Huron at the close of the month.

TABLE I.

| Barometer. | First observed. | | | Last observed. | | Duration. | Velocity per hour. | Maximum abnormal changes in pressure in twelve hours, with maximum abnormal changes in temperature and maximum wind velocities in connection therewith. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date. | Lat. N. | Long. W. | Lat. N. | Long. W. | | | Rise. | Station. | Date. | Fall. | Station. | Date. | Miles per hour. | Direction. | Station. | Date |
| High areas. | | ° | ° | ° | ° | *Days.* | *Miles.* | *Inch.* | | | ° | | | | | | |
| I | 1 | 48 | 82 | 46 | 59 | 1.5 | 41 | .68 | Rockliffe, Ont | 1 | 32 | Chatham, N. B | 1 | 44 | w. | Montreal, Quebec | 1 |
| II | 2 | 54 | 112 | 50 | 73 | 2.0 | 40 | .82 | Port Arthur, Ont | 3 | 40 | Bismarck, N. Dak | 2 | 42 | w. | Northfield, Vt | 4 |
| III | 4 | 56 | 110 | 45 | 65 | 3.0 | 34 | 1.04 | ....do | 5 | 44 | Fort Buford, N. Dak | 4 | 72 | nw. | Fort Buford, N. Dak | 4 |
| IV | 5 | 38 | 127 | 44 | 72 | 5.5 | 31 | .78 | Winnipeg, Man | 7 | 28 | Fort Sully, S. Dak | 7 | 64 | nw. | Bismarck, N. Dak | 7 |
| V | 10 | 48 | 127 | 38 | 72 | 3.5 | 40 | .64 | Denver, Colo | 10 | 25 | Cheyenne, Wyo | 10 | 60 | n. | Fort Elliott, Tex | 11 |
| VI | 13 | 43 | 126 | 33 | 97 | 2.5 | 33 | .42 | Medicine Hat, N. W. T. / Fort Sill, Ind. T | 13 / 14 | 33 | Saint Vincent, Minn | 13 | 48 | nw. | Winnemucca, Nev | 13 |
| VII | 15 | 52 | 88 | 35 | 72 | 1.5 | 44 | .62 | Kingston, Ont | 15 | 40 | Quebec, Quebec | 15 | 46 | nw. | Block Island, R. I | 16 |
| VIII | 15 | 55 | 108 | 32 | 79 | 7.5 | 14 | .58 | Chicago, Ill | 20 | 38 | Fort Custer, Mont | 15 | 52 | nw. | ....do | 21 |
| IX | 23 | 54 | 115 | 39 | 105 | 5.0 | 15 | .58 | Brownsville, Tex | 28 | 39 | San Antonio, Tex | 27 | 72? | n. | Rio Grande City, Tex | 28 |
| IX a | 26 | 47 | 118 | 40 | 110 | 2.0 | 17 | .48 | Montrose, Colo | 27 | 23 | Santa Fé, N. Mex | 27 | 34 | sw. | Ft. Assinniboine, Mont | 28 |
| Mean | .... | 49 | 111 | 40 | 80 | 3.4 | 31 | .66 | ..... | .... | 34 | ..... | .... | 53 | ..... | ..... | .... |
| Low areas. | | | | | | | | Fall. | | | Rise. | | | | | | |
| I | 1 | 48 | 125 | 57 | 61 | 2.5 | 55 | .70 | Sydney, C. B. I | 3 | 36 | Bismarck, N. Dak | 1 | 68 | s. | Fort Canby, Wash | 1 |
| II | 3 | 55 | 125 | 47 | 57 | 2.5 | 58 | .98 | Father Point, Quebec | 5 | 29 | Minnedosa, Man | 3 | 72 | s. | ....do | 3 |
| III | 5 | 36 | 112 | 32 | 83 | 2.5 | 31 | .24 | Santa Fé, N. Mex | 6 | 8 | Fort Elliott, Tex | 6 | 44 | s. / nw. | Pensacola, Fla / El Paso, Tex | 8 / 6 |
| IV | 6 | 52 | 109 | 49 | 61 | 2.5 | 45 | 1.20 | Anticosti Island, G. of S. L | 8 | 30 | Ft. Assinniboine, Mont | 6 | 52 | s. | Sandy Hook, N. J | 8 |
| V | 7 | 49 | 124 | 46 | 92 | 2.0 | 37 | .76 | Swift Current, N. W. T | 8 | 25 | Denver, Colo | 8 | 52 | s. | Fort Canby, Wash | 7 |
| VI | 9 | 50 | 126 | 30 | 101 | 2.0 | 58 | .34 | Qu'Appelle, N. W. T / Huron, S. Dak | 9 / 10 | 27 | Brownsville, Tex | 10 | 40 | s. / sw. | Dodge City, Kans / Fort Elliott, Tex | 10 |
| VII | 11 | 48 | 87 | 48 | 64 | 1.5 | 35 | .52 | Quebec, Quebec / Montreal, Quebec | 12 | 25 | Montreal, Quebec | 12 | 36 | s. | Buffalo, N. Y | 12 |
| VIII | 12 | 54 | 109 | 45 | 75 | 2.5 | 31 | .72 | Minnedosa, Man | 12 | 19 | Moorhead, Minn | 12 | 42 | sw. | Ft. Assinniboine, Mont | 12 |
| IX | 13 | 32 | 95 | 49 | 66 | 2.0 | 45 | .66 | Chatham, N. B | 15 | 20 | Norfolk, Va | 14 | 48 | s. / w. | Atlantic City, N. J / Father Point, Quebec | 14 / 15 |
| X | 10 | 51 | 125 | 49 | 60 | 7.0 | 26 | 1.30 | Halifax, N. S | 20 | 31 | Halifax, N. S | 20 | 56 | nw. | Sandy Hook, N. J | 20 |
| XI | 16 | 39 | 100 | 42 | 67 | 3.0 | 26 | .28 | Boston, Mass | 18 | 22 | Parry Sound, Ont | 16 | 48 | nw. / n. | Quebec, Quebec / Montreal, Quebec | 18 |
| XII | 20 | 40 | 123 | 33 | 103 | 2.5 | 23 | .30 | Memphis, Tenn / Cairo, Ill | 22 | 20 | Abilene, Tex | 22 | 44 | w. | Pueblo, Colo | 22 |
| XIII | 23 | 52 | 96 | 45 | 85 | 1.5 | 20 | .58 | Swift Current, N. W. T | 22 | 21 | Moorhead, Minn | 22 | 36 | sw. | Ft. Assinniboine, Mont | 23 |
| XIV | 24 | 33 | 100 | 43 | 67 | 2.5 | 36 | .24 | Atlantic City, N. J | 25 | 18 | Washington City / Fort Sill, Ind. T | 25 / 24 | 40 | n. | Green Bay, Wis | 25 |
| XV | 24 | 42 | 107 | 50 | 75 | 4.5 | 33 | .42 | Saugeen, Ont | 28 | 20 | Minnedosa, Man | 27 | 52 | sw. | Fort Stanton, N. Mex | 26 |
| Mean | .... | 45 | 111 | 44 | 74 | 2.7 | 37 | .62 | ..... | .... | 23 | ..... | .... | 49 | ..... | ..... | .... |

## NORTH ATLANTIC STORMS FOR FEBRUARY, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during February, 1890, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eight depressions have been traced for February, 1890, the average number traced for the corresponding month of the last seven years being ten. The greatest number of depressions previously traced for February was twelve, in 1887, and the least number was seven, in 1889. All of the depressions traced for the current month advanced eastward from the American continent north of the fortieth parallel; two of the depressions moved to the British Isles; four passed north of the region of observation between the fifteenth and thirty-fifth meridians; and two apparently dissipated before reaching the fortieth meridian. The average path of the depressions was more northerly than the usual February tracks of storms over the north Atlantic, and no severe storms were reported south of the fortieth parallel.

The movements of areas of high pressure over the north Atlantic during the month were as follows: On the 1st the

pressure was high from coast to coast. On the 2d an area of high pressure was central over the Canadian Maritime Provinces, whence it moved eastward, reaching the British Isles on the 5th. On the 7th an area of high pressure was central over the Canadian Maritime Provinces, whence it moved eastward over the Grand Banks by the 8th, to mid-ocean by the 9th, and thence apparently passed eastward to the British Isles by the 10th. On the 9th an area of high pressure was central over the middle Atlantic coast, whence it extended eastward south of Nova Scotia and Newfoundland during the 10th and 11th, and by the 14th had moved eastward to the Azores. From the 13th to 15th an area of high pressure moved from the middle Atlantic coast to the Azores. On the 16th an area of high pressure extended from the lower lake region to the south Atlantic coast, whence it contracted to the southward and on the 17th extended from the south Atlantic coast to the Bermudas, after which it moved eastward to the Azores by the 19th. On the 21st an area of high pressure was central over the south Atlantic states and Florida, where it remained nearly stationary during that and the following date, after which it moved slowly eastward, and on the 24th the pressure was high from the Bahamas to Newfoundland; contracting northward the area of high pressure apparently advanced to mid-ocean by the 26th, and reached the British Isles by the 27th. On the 27th an area of high pressure was central on the middle Atlantic coast, whence it moved northeastward over the Canadian Maritime Provinces by the 28th.

Compared with the corresponding month of the last seven years the storms reported over the north Atlantic ocean during February, 1890, were deficient in number and energy. Over the western portion of the ocean the storm periods were from the 4th to 6th, 8th, 9th, 13th, 15th to 22d, and 26th to 28th, the severest storms of the month occurring over and near Newfoundland from the 20th to 22d, when strong to whole gales were reported in that region. Over mid-ocean stormy weather prevailed on the 5th, 7th to 14th, 18th to 22d, 25th and 27th, the severest storms occurring on the 11th, 13th, 14th, and 18th to 22d, when strong to whole gales were reported, and where on the 20th gales of hurricane force were reported, Over the eastern part of the ocean generally settled weather and high barometric pressure prevailed during the first decade of the month, and from the 21st to 28th, inclusive, while during the second decade of the month generally stormy weather prevailed in that region, strong to whole gales being reported on the 11th, and fresh to strong gales on the 12th and 15th to 17th. The captain of the s. s. "Allemania" reports that a severe "norther" prevailed at Vera Cruz, Mexico, on the 28th, commencing at 10 a. m. The wind increased suddenly to force 10 (Beaufort scale); the sea in the harbor rose rapidly, sweeping over the custom house wharf; and two lighters were capsized and totally wrecked. The gale blew with the same strength for thirty hours and then decreased and shifted to westward. The barometer began to fall on the 25th, when the "Allemania" was at anchor in Progresso Road, and continued to fall during the voyage to Vera Cruz, with fine weather. On the 28th, at noon, the barometer read 29.56 (751), and at 4 p. m. the lowest reading, 29.54 (750), was noted, after which the pressure increased rapidly.

The following are brief descriptions of the depressions traced for February, 1890:

**1.**—This depression was a continuation of low area i, which moved eastward over the Saint Lawrence Valley and the Gulf of Saint Lawrence during the 3d. On the morning of the 4th the depression was central north of Newfoundland, with pressure below 29.40 (747), whence it moved eastward to the thirty-fifth meridian by the 5th, and thence passed northward, beyond the region of observation, along the western margin of an area of high pressure which occupied the British Isles and the adjacent ocean to the twentieth meridian.

**2.**—This depression was the continuation of low area ii, which was central over the Canadian Maritime Provinces on the 5th, with pressure below 29.10 (739). By the morning of the 6th the storm-centre had passed eastward over Newfoundland, attended by fresh to strong gales, and by the 7th had advanced east northeast to the thirty-fifth meridian, with an apparent decrease in energy. By the 8th the centre of depression had passed eastward to the thirtieth meridian, its eastward movement having been retarded by an area of high pressure to the eastward, and by the 9th had moved south of east to the twentieth meridian, along the southwest margin of an area of high pressure which was apparently central over the North Sea. By the 10th the depression had apparently recurved to the north and west under the influence of the area of high pressure to the eastward and a depression advancing over mid-ocean from the westward, with which latter named area it probably united.

**3.**—This depression was a continuation of low area iv, which advanced over the Saint Lawrence Valley and the Gulf of Saint Lawrence during the 8th. On the morning of the 9th the depression was central south of Newfoundland, with pressure below 29.30 (744) and strong to whole gales, whence it passed north of east to about the thirty-fifth meridian by the 10th, and thence following an east-northeast course disappeared over the British Isles after the 12th, attended throughout by gales of considerable force.

**4.**—This depression was a continuation of low area vii, which advanced over the Saint Lawrence Valley and the Gulf of Saint Lawrence during the 12th. On the morning of the 13th the depression was central south of Newfoundland, with pressure below 29.50 (749) and moderate to fresh gales, whence it moved rapidly east-northeast to the thirty-fifth meridian by the 14th, attended by fresh to strong gales and a slight decrease in central pressure, and thence moved eastward to about the fifteenth meridian by the 15th. During the 16th and 17th the depression apparently remained central southwest of the British Isles, after which it probably recurved to the north and west and united with a depression which was advancing eastward over mid-ocean.

**5.**—This depression was a continuation of low area ix, which was central over the Canadian Maritime Provinces on the 15th, with central pressure below 29.10 (739), whence it moved to northern Newfoundland by the morning of the 16th, with pressure below 29.40 (747) and fresh gales. By the 19th the depression had moved eastward to about the twentieth meridian, attended by fresh to strong gales, after which it passed northward beyond the region of observation.

**6.**—This depression was a continuation of low area xi, which was central over the middle Atlantic states on the evening of the 18th, whence it passed to the south of Nova Scotia by the morning of the 19th, with pressure below 29.70 (754) and fresh to strong gales. By the morning of the 20th the depression had advanced to the east edge of the Banks of Newfoundland, attended by pressure falling below 29.20 (742) and gales attaining hurricane force. By the 21st the centre of depression had moved northeast beyond the region of observation.

**7.**—This depression was a continuation of low area x, which moved eastward over New England during the 20th, whence it passed northeastward over Newfoundland during the 21st, with pressure below 29.20 (742) and gales attaining hurricane force, and by the 22d had moved to the north of the Grand Banks, attended by severe gales west of the thirty-fifth parallel, after which it apparently disappeared by an increase of pressure on the west margin of an area of high pressure which occupied the eastern half of the ocean.

**8.**—This depression was a continuation of low area xiv, which was central over New England on the morning of the 26th, and thence moved rapidly eastward over the Grand Banks by the 27th. The advance of this depression east of the fortieth parallel was apparently opposed by an area of high pressure which occupied the ocean east of the thirty-fifth meridian, and moderate to fresh gales prevailed over and near the Grand Banks during the 27th and 28th, on which dates the storm was central in that region.

## OCEAN ICE IN FEBRUARY.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for February, during the last eight years:

| Southern limit. | | | Eastern limit. | | |
|---|---|---|---|---|---|
| Month. | Lat. N. | Long. W. | Month. | Lat. N. | Long. W. |
| | ° ′ | ° ′ | | ° ′ | ° ′ |
| February, 1883 | 42 01 | 52 46 | February, 1883 | 46 19 | 45 44 |
| February, 1884 | 42 00 | 50 00 | February, 1884 | 46 50 | 43 45 |
| February, 1885 | 41 50 | 51 12 | February, 1885 | 47 52 | 42 00 |
| February, 1886 | 46 10 | 47 15 | February, 1886 | 48 00 | 44 47 |
| February, 1887 | 40 00 | 48 00 | February, 1887 | 46 26 | 41 50 |
| February, 1888 | 44 59 | 45 08 | February, 1888 | 44 59 | 45 08 |
| February, 1889 | 45 35 | 48 00 | February, 1889 | 45 35 | 48 00 |
| February, 1890 | 41 12 | 50 12 | February, 1890 | 44 30 | 35 30 |

Ice was reported about two degrees south and about nine degrees east of the average southern and eastern limits of Arctic ice for February. The southernmost ice reported consisted of large icebergs and a quantity of field ice, observed on the 15th in the position given, and in the easternmost position given in the table twenty icebergs were reported on the 14th. For February of preceding years Arctic ice has been reported farther south than the southernmost position reported for the current month in but one year only, 1887, and the easternmost ice reported for the current month was about six degrees farther east than the easternmost position in which ice has been reported for February of preceding years. In February, 1888 and 1889, no icebergs were reported near Newfoundland and the Grand Banks. In each of these years field ice was reported over or near the Grand Banks, and in 1889 Gulf ice was encountered south of Newfoundland.

While the aggregate quantity of ice noted for the current month probably exceeded the amount reported for any February of preceding years, it was not largely in excess of the quantity reported for February, 1883, 1884, 1885, and 1887, and Gulf ice in the tracks of vessels between Newfoundland and Nova Scotia is not an unusual feature of the month. The southward movement of ice from north of Newfoundland commonly commences in February, and the ice record for the current month is therefore remarkable only when considered in connection with the enormous excess during the preceding winter months, and ends a winter season during which the movement of Arctic ice has been unparalleled during the last eight years.

The following positions of icebergs and field ice reported for February, 1890, are shown on chart i by ruled shading:

1st.—N. 43° 24′, W. 48° 35′, one very large and two small bergs and several small pieces of ice; N. 46° 05′, W. 47° to N. 44° 18′, W. 48° 40′, heavy field ice, with bergs of enormous size; N. 47° 50′, W. 48° 05′, berg; N. 44° 52′, W. 49° 47′, berg; N. 46° 42′, W. 46° 54′ to N. 43° 47′, W. 48° 52′, dense field ice and several large bergs; steamed along the edge of field ice for one hundred and ninety miles; N. 44° 56′, W. 45° 05′, two bergs and several small pieces of ice to the westward; N. 43° 14′, W. 48° 40′, large berg; N. 49°, W. 49° 19′, large berg and field ice.

1st to 3d.—N. 47° 44′, W. 47° 03′ to N. 44° 14′, W. 48° 48′, large ice field, containing several large bergs.

2d.—N. 44° 50′, W. 48° 05′ to N. 44° 48′, W. 48° 10′, heavy field ice and one berg; N. 44° 57′, W. 47° 24′, berg fifty feet high and two hundred feet long, and another one hundred and fifty high; also small bergs and heavy field ice; N. 42° 55′, W. 48° 08′, field of ice about five miles in extent; N. 45° 10′, W. 48° 11′, twenty bergs, ranging in size from sixty to two hundred feet high, and at 5 p. m. saw a schooner fast in the ice, with all sails set; N. 43° 25′, W. 48° 58′ to N. 43° 22′, W. 49° 05′, large field of floe ice five miles in extent; N. 43° 45′, W. 48° 35′, very large berg, two hundred and forty-five feet high; N. 44° 10′, W. 48° 45′, large berg, about one hundred and fifty feet high; N. 43° 49′, W. 49° 28′, high berg.

3d.—N. 44°, W. 48° to W. 49°, eighteen small bergs in dense field of ice; N. 44° 52′, W. 46° 45′, eight large bergs; N. 45°, W. 47° to N. 43°, W. 49°, three large bergs, and sailed southward along the edge of field ice for twelve hours; N. 43° 17′, W. 49° 35′, berg with large round base; N. 45° 16′, W. 47° 17′, large double berg; N. 43° 30′, W. 50° 20′, densely packed field of ice for twenty miles; 9 p. m., berg one-fourth of a mile long and three hundred feet high.

4th.—N. 42° 59′, W. 49° 33′, berg; N. 45° 17′, W. 49° 28′, large berg; N. 46° 55′, W. 46° 45′, field of ice; N. 45° 48′, W. 47°, field ice and small berg; N. 45° 52′, W. 48° 40′, medium-sized berg; N. 44° 29′, W. 47° 49′, field ice for twelve hours; N. 43° 53′, W. 48° 13′, bergs and vast fields of drift ice; N. 42° 55′, W. 48° 10′, field of ice several miles in extent; N. 45°, W. 46°, berg four hundred feet long and forty feet high, also a great quantity of smaller bergs and field ice; N. 44°, W. 49° 23′, large quantities of field ice; N. 45° 40′, W. 47° 18′, berg one hundred and eighty feet high; N. 45° 20′, W. 48° 13′, field ice; skirted ice for one hundred and seventy-four miles; southern edge in N. 43° 26′, W. 49° 04′; there were several small bergs in the ice field, and large one one hundred and fifty feet high in N. 44° 08′, W. 48° 13′; N. 43° 18′, W. 49° 44′ to N. 43° 15′, W. 49° 26′, large quantities of drift ice.

5th.—N. 43°, W. 49° 55′, large berg; steamer "Miranda" sustained damage from heavy ice from Saint John's to Halifax; N. 44° 35′, W. 48° 40′ to N. 43° 50′, W. 48° 56′, three very large bergs and ice field; N. 46° 59′, W. 43° 49′ to N. 45° 30′, W. 48° 20′, large berg and field ice for sixty-five miles; N. 44° 05′, W. 48° 30′, nine bergs and field ice; N. 43° 52′, W. 48° 33′, two bergs; N. 43° 22′, W. 49° 25′, field ice; N. 43° 26′, W. 49°, packed field ice; N. 46° 25′, W. 46° 33′ to N. 44° 50′, W. 48° 52′, fields of ice and fifty bergs; N. 42° 53′, W. 50° 02′, large berg and numerous patches of field ice for a distance of twenty miles; N. 45° 15′, W. 48° 14′, in ice pack for thirty hours, damage to vessel; N. 46° 06′, W. 46° 46′ to N. 43° 45′, W. 49° 39′, heavy packed ice and six very large bergs.

5–6th.—N. 45° 50′, W. 47° 40′ to N. 45°, W. 48° 50′, immense patches of field ice.

6th.—N. 43° 09′, W. 49° 04′ to N. 42° 55′, W. 49° 38′, for many miles pieces of ice not more than ten or twelve feet square and one or two feet above water; N. 44° 12′, W. 50° 30′, berg; N. 44° 05′, W. 51°, ice fields; N. 45° 40′, W. 47° 44′ to N. 44° 24′, W. 48° 52′, field ice; three bergs within two miles of each other at noon in N. 44° 54′, W. 48° 29′; shortly afterwards passed several bergs; N. 42° 50′, W. 49° to N. 42° 50′, W. 48° 20′, heavy pack of field ice; N. 44° 12′, W. 48° 10′ to N. 44° 05′, W. 48° 40′, large berg.

7th.—N. 43° 02′, W. 49° 31′ to N. 43°, W. 50° 04′, field ice; N. 43° 07′, W. 49° 42′, large berg; N. 45° 10′, W. 48° 26′ to N. 43° 55′, W. 49°, field ice; N. 43° 29′, W. 48° 50′, field ice; N. 43° 05′, W. 49° 19′, one berg; N. 42° 56′, W. 50°, one berg; N. 44°, W. 48° 48′, berg.

8th.—N. 44° 30′, W. 48° 40′ to N. 44° 25′, W. 48° 43′, two medium and two small bergs; N. 44° 21′, W. 48° 44′, four bergs, two medium and two small; N. 43° 55′, W. 48° 40′, two bergs, one very large, visible ten miles; N. 43° 09′, W. 48° 47′, small pieces of ice; N. 43°, W. 49° 15′, large berg; N. 42° 55′, W. 50° 11′, very large berg; N. 43° 25′, W. 48° 39′ to N. 43° 24′, W. 49° 19′, small berg and field ice; N. 42° 55′, W. 49° 15′, very large berg; N. 47°, W. 47°, field ice north and south; was in the ice for thirty-six hours, during which time saw one hundred bergs; N. 44° 40′, W. 47° 39′ to N. 44° 42′, W. 48° 50′, large berg and field ice; N. 43° 30′, W. 49°, bergs and field ice.

9th.—N. 42° 48′, W. 50° 18′, large berg and quantity of field ice; N. 46° 30′, W. 47° to N. 42° 50′, W. 48°, field ice and twenty bergs; N. 44° 48′, W. 49° 51′, large quantities of field ice and three large bergs; N. 44° 02′, W. 48° 17′, a berg; N. 43° 58′, W. 48° 35′, a large conical berg; N. 45° 43′, W. 46° 29′, large berg.

10th.—N. 44° 41′, W. 46° 06′, very large berg; N. 44° 31′, W. 48° 29′, large berg; N. 42° 58′, W. 48° 48′, an enormous berg; N. 44° 39′, W. 48° 32′, numerous bergs.

11th.—N. 44° 39′, W. 45° 42′, large berg; N. 43° 48′, W. 48° 17′, large berg; N. 42° 25′, W. 51° 01′, large berg; N. 42° 54′, W. 48° 58′, very large berg; N. 47° 39′, W. 47° 47′, small quantity of broken field ice and two small bergs.

11–12th.—N. 45°, W. 48° to N. 43°, W. 49°, an immense field of ice and twenty bergs.

12th.—N. 43° 14′, W. 48° 40′, high berg; N. 42° 52′, W. 48° 44′, large berg; N. 46° 02′, W. 45° 40′, small berg; N. 44° 30′, W. 48° 36′, very large berg and field ice; N. 44°, W. 49° 25′, field ice; N. 43° 50′, W. 49° 30′, field ice; N. 44° 36′, W. 46° 52′, three bergs; N. 44° 26′, W. 47° 30′, seventeen bergs; N. 44° 19′, W. 48° 02′ to N. 44° 10′, W. 49° 19′, six bergs and ice field; N. 43° 07′, W. 41° 55′, two bergs.

13th.—N. 45° 04′, W. 45° 32′, thirty-five bergs between 6.30 a. m. and 1 p. m.; N. 43° 49′, W. 47° 50′, berg about 180 feet high and 1,000 feet long; N. 43° 33′, W. 48° 17′ to N. 43° 21′, W. 48° 39′, fields of thin broken ice; N. 45° 11′, W. 46° 58′ to N. 44° 43′, W. 48° 54′, thirty-five bergs and small pieces; N. 45°, W. 45°, two large bergs; N. 46° 10′, W. 45° 20′ to N. 44° 40′, W. 49°, many large and small bergs, heavy pack and field ice; N. 43° 20′, W. 48° 46′, berg.

13–14th.—N. 43° 45′, W. 48° 26′ to N. 43° 22′, W. 49° 12′, three large bergs and field ice to the north.

14th.—N. 45° 29′, W. 44° 39′, two bergs; N. 45° 07′, W. 45° 12′, small berg; N. 44° 30′, W. 35° 30′, twenty bergs; N. 43° 38′, W. 46°, large berg; N. 44° 10′, W. 48° 20′, two bergs.

14–15th.—N. 45° 20′, W. 44° 50′ to N. 43° 08′, W. 49°, 12′, several bergs, and on extreme southern edge of the Grand Banks passed field ice for three and one-half hours.

15th.—N. 43° 11′, W. 49° 18′, berg and small floe of ice; N. 43°, W. 49° to N. 42° 58′, W. 49° 30′, two bergs and field ice; N. 47° 36′, W. 41° 53′, small berg; N. 41° 12′, W. 50° 12′, two large bergs and field ice; N. 43°, W. 48° 30′, two bergs.

16th.—N. 46°, W. 45° 50′, four bergs and patches of field ice; N. 45° 40′, W. 46° 07′ to N. 45° 04′, W. 48°, large and small bergs, and from 3 p. m. to 5.30 p. m., several large ice fields; N. 44° 46′, W. 43° 49′, large berg.

17th.—N. 43° 08′, W. 48° 43′ to N. 42° 54′, W. 49° 18′, two bergs; N. 42° 24′, W. 42° 45′, two bergs; N. 47°, W. 41°, berg.

19th.—N. 45° 07′, W. 41° 55′, two bergs 30 feet high; N. 43°, W. 41° 30′, four large bergs; N. 47° 20′, W. 44° 30′, small berg; N. 44° 56′, W. 42° 13′, small bergs.

20th.—N. 45° 40′, W. 48°, several large bergs.

22d.—N. 44° 40′, W. 48° 20′, large and small bergs; and in N. 44° 37′, W. 48° 20′ to N. 44° 18′, W. 49° 22′, field ice; N. 44° 24′, W. 44° 05′, berg with two peaks about 60 feet high; N. 46° 30′, W. 46° 44′, vast ice floe; steamed through it for 18 hours, during which sighted 30 bergs, several very large.

23d.—N. 43° 20′, W. 48° 40′, field-ice for fifty miles; N. 43° 15′, W. 52° 05′, field-ice; N. 44° 11′, W. 48° 13′ to N. 44° 51′, W. 50° 06′, medium sized berg and field ice; N. 42° 52′, W. 49° 01′, two bergs; N. 42° 45′, W. 50°, ice field and large berg.

24th.—N. 43° 37′, W. 48° 31′, large berg; N. 43° 33′, W. 49° 01′, three bergs and patches of field ice; N. 42° 47′, W. 49° 23′, small berg; N. 44° 23′, W. 48° 45′, quantity of ice; N. 45° 16′, W. 45° 10′, two bergs.

25th.—N. 42° 35′, W. 49° 40′, broken field ice and two bergs; N. 42° 20′, W. 50° 35′, large ice floe, large bergs.

27th.—N. 43° 19′, W. 48° 12′, small berg and field ice; N. 42° 33′, W. 50°, two moderate sized bergs; N. 43° 45′, W. 48° 17′ to N. 42° 42′, W. 49° 30′, detached ice, one small berg and two large ones; N. 43° 19′, W. 48° 12′ to N. 42° 32′, W. 50° 18′, field ice, one small and two moderate sized bergs; N. 43′ 05′, W. 48° 40′ to N. 43° 05′, W. 48° 50′, small bergs, large quantities of field ice; N. 45° 16′, W. 45° 10′ to N. 45° W. 45° 50′, berg about one hundred and thirty feet high, and small berg; N. 43°, W. 49° 10′ to N. 42°, W. 50°, several bergs, field ice.

28th.—N. 43° 17′, W. 48° 12′ to N. 43° 32′, W. 50° 18′, large quantities of detatched field ice and two bergs; N. 43° 09′, W. 49° 08′ to N. 42° 40′, W. 50° 20′, field ice and two bergs four hundred feet long and sixty feet high; N. 42° 36′, W. 50° 20′, field ice; N. 45° 50′, W. 47° 40′, heavy pack ice; N. 45° 14′, W. 47° 22′, berg one hundred feet high and two hundred feet long; N. 44° 35′, W. 48° 30′, packed field ice.

28th–March 2d.—Light slab ice from Halifax to N. 44° 40′ W. 60°; N. 44° 45′, W. 59° 10′ to N. 45° 08′, W. 57° 43′, heavy Gulf field ice; N. 45° 35′, W. 55° 15′, rotten field ice.

## FOG IN FEBRUARY.

The limits of fog-belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on thirteen dates; between the fifty-fifth and sixty-fifth meridians on six dates; and west of the sixty-fifth meridian on five dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks were two less than the average; between the fifty-fifth and sixty-fifth meridians the same as the average; and west of the sixty-fifth meridian two less than the average. In each instance fog was reported in the regions referred to attending the approach or passage to the northward of low pressure storms. On the 25th dense fog prevailed along the Atlantic coast from Portland, Me., to Norfolk, Va., attending the advance eastward of an area of low pressure to the lower lake region. The fog on Long Island Sound was so dense as to seriously interrupt navigation, and all Sound steamers were twelve to eighteen hours late at New London, Conn. On the 26th dense fog prevailed on the New England coast south of Boston, Mass., attending the approach and passage over New England and the ocean to the eastward of a low pressure storm. On the 28th dense fog prevailed along the Atlantic coast from southern New England to Norfolk, Va., with the passage of a low pressure storm over the lower lake region and the Saint Lawrence Valley. Dense fog prevailed at New London, Conn., on the 3d, attending the passage of an area of low pressure over the Saint Lawrence Valley, and a number of vessels took refuge in that port on account of the dense fog.

The following are limits of fog-areas on the north Atlantic Ocean, west of the fortieth meridian, for February, 1890, as reported by shipmasters:

| Date. | Entered. | | Cleared. | | Date. | Entered. | | Cleared. | |
|---|---|---|---|---|---|---|---|---|---|
| | Lat. N. | Lon. W. | Lat. N. | Lon. W. | | Lat. N. | Lon. W. | Lat. N. | Lon. W. |
| | ° ′ | ° ′ | ° ′ | ° ′ | | ° ′ | ° ′ | ° ′ | ° ′ |
| 1 | 43 28 | 49 02 | 43 24 | 49 25 | 20 | 41 53 | 59 08 | 41 47 | 59 38 |
| 1 | 42 26 | 53 39 | 42 50 | 49 10 | 21–22 | 44 20 | 38 00 | 43 15 | 45 01 |
| 3 | 41 10 | 65 40 | 41 13 | 65 20 | 25 | 40 13 | 63 05 | 40 05 | 64 30 |
| 3 | 40 36 | 68 30 | 40 32 | 70 40 | 25 | 42 24 | 61 38 | 40 20 | 72 09 |
| 3 | 43 52 | 50 13 | 43 50 | 50 48 | 25 | 40 41 | 70 09 | Off Sandy Hook. | |
| 4 | 43 47 | 52 42 | 43 46 | 53 12 | 25 | 35 52 | 74 52 | 41 06 | 71 25 |
| 4 | 44 13 | 48 35 | 43 01 | 50 47 | 26 | 39 57 | 66 00 | 39 30 | 71 20 |
| 4 | 45 40 | 46 30 | 45 00 | 47 20 | 26 | 42 20 | 51 15 | 42 02 | 53 19 |
| 5 | 43 04 | 61 00 | 42 58 | 61 59 | 26–27 | 42 40 | 48 20 | 41 38 | 54 30 |
| 5 | 41 41 | 49 43 | 41 45 | 49 23 | 26–27 | 41 02 | 63 04 | 40 56 | 64 09 |
| 6 | 42 30 | 59 50 | 43 51 | 60 39 | 26–27 | 45 10 | 44 20 | 43 15 | 48 40 |
| 6 | 43 03 | 50 05 | 43 00 | 51 10 | 27 | 41 40 | 48 42 | 41 14 | 50 59 |
| 6 | 42 50 | 49 00 | 42 50 | 48 20 | 27 | 44 58 | 45 26 | 42 42 | 50 05 |
| 8 | 42 30 | 69 25 | Off Minots. | | 27 | 43 47 | 47 44 | 43 36 | 49 54 |
| 13 | 43 38 | 51 10 | 43 34 | 51 31 | 27–28 | 43 56 | 47 43 | 42 11 | 50 45 |
| 16 | 45 17 | 47 38 | 44 50 | 48 50 | 28 | 38 55 | 71 54 | 38 13 | 73 26 |
| 19 | 42 48 | 51 17 | 42 46 | 51 30 | | | | | |

## TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for February, 1890, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical dis-